

ZTalk-AI: An Intelligent Placement Readiness Framework Integrating Adaptive Interview Assessment and Resume Intelligence

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Abstract—Preparing students for modern recruitment processes remains a challenge, as many existing placement preparation methods rely on manual resume reviews, fixed mock interview questions, and limited personalized feedback. To address these shortcomings, this work presents ZTalk-AI, an intelligent placement readiness framework developed to support candidates through automated resume evaluation, adaptive interview practice, behavioral assessment, and readiness scoring.

The system employs the Gemini large language model to analyze resume content, generate concise candidate summaries, and suggest suitable job roles based on identified skills and experiences. An adaptive interview module was developed to create role-specific questions whose difficulty changes according to candidate performance during the assessment. To provide a more realistic interview environment, the framework supports both text-based and voice-based interactions using Deepgram speech recognition and Kokoro text-to-speech technologies.

During development, particular attention was given to creating an assessment workflow that resembles real recruitment processes while maintaining low response latency and continuous user engagement. In addition to evaluating interview responses, the system incorporates behavioral monitoring features that examine candidate attentiveness and participation throughout interview sessions. A placement readiness score is generated by combining resume quality, interview performance, coding assessment outcomes, and assessment integrity indicators.

Experimental observations showed an average resume analysis time of 1.65 seconds and an interview evaluation latency of 1.15 seconds. Candidate-role recommendations demonstrated a correlation accuracy of 94.2% when compared with recruiter evaluations. User feedback collected during testing indicated an average satisfaction rating of 4.6 out of 5, while the proctoring module achieved a precision of 89.5%, recall of 92.1%, and F1-score of 90.8%. The findings suggest that ZTalk-AI can assist both candidates by providing a structured, data-driven approach to placement readiness assessment and interview preparation.

Keywords: Placement Readiness Assessment, Artificial Intelligence, Adaptive Interview System, Resume Intelligence, Large Language Models, Candidate Evaluation, Behavioral Analytics, Speech Recognition, Employability Assessment, Recruitment Technology.

I. INTRODUCTION

The recruitment process has changed considerably over the last decade, particularly within the technology sector, where employers increasingly emphasize practical skills, communication ability,

problem-solving capabilities, and interview performance alongside academic achievements. As a result, students preparing for placements are expected to demonstrate not only technical knowledge but also the ability to perform effectively in dynamic interview environments. Despite the availability of online learning resources, coding platforms, and aptitude training programs, many candidates still struggle to assess their actual level of interview readiness before participating in recruitment drives.

A common limitation observed during placement preparation is the lack of personalized feedback. Resume reviews are often conducted manually, mock interviews frequently follow fixed question patterns, and performance evaluation usually depends on individual trainers or mentors. While these approaches provide useful guidance, they rarely offer a complete picture of a candidate's strengths, weaknesses, and overall employability. In addition, resume evaluation, technical assessment, and interview preparation are typically handled through separate tools, making it difficult to obtain a unified assessment of placement readiness.

Recent developments in Artificial Intelligence, large language models, speech processing systems, and behavioral analytics have created opportunities to improve this process. These technologies make it possible to analyze resume content, generate contextual interview questions, evaluate candidate responses, and provide immediate feedback in a consistent manner. During the development of modern interview preparation platforms, it has become evident that AI can help create assessment experiences that more closely resemble real recruitment scenarios while reducing the dependency on manual evaluation.

Motivated by these observations, this work introduces ZTalk-AI, an intelligent placement readiness framework developed to support candidates throughout the preparation process. The system combines resume intelligence, adaptive interview assessment, behavioral analytics, and readiness scoring within a single platform. Resume analysis is performed using the Gemini Large Language Model, which generates candidate summaries and identifies suitable job-role alignments from resume content. To provide a more realistic interview experience, the framework includes an adaptive interview engine capable of modifying question difficulty according to candidate performance. Both text-based and voice-based interview modes are supported through the integration of Deepgram speech recognition and Kokoro text-to-speech technologies.

Another important aspect of the framework is its ability to evaluate multiple dimensions of candidate performance rather than focusing solely on interview responses. Behavioral indicators, assessment integrity metrics, coding performance, and resume quality are collectively considered when generating a placement readiness score.

This approach allows candidates to obtain a broader understanding of their preparation level while also providing structured evaluation insights that may be useful during recruitment activities.

The major contributions of this research are summarized below:

1. Development of a resume intelligence module that performs contextual resume analysis and role-alignment assessment using large language models.
2. Design and implementation of an adaptive interview engine capable of adjusting question complexity according to candidate responses.
3. Integration of voice-based and text-based interview workflows through speech recognition and conversational AI technologies.
4. Incorporation of behavioral analytics mechanisms for evaluating attentiveness, participation, and assessment integrity.
5. Formulation of a placement readiness scoring model that combines multiple evaluation factors into a unified employability score.
6. Validation of the framework through performance benchmarking, usability analysis, and candidate assessment experiments.

The results obtained during system evaluation indicate that combining AI-driven resume analysis, adaptive interviews, and behavioral assessment can provide a more comprehensive representation of candidate readiness than traditional placement preparation approaches. The proposed framework demonstrates how multiple assessment components can be integrated within a single ecosystem to support data-driven interview preparation and employability evaluation.

II. LITERATURE REVIEW

The growing adoption of Artificial Intelligence in recruitment and employability assessment has motivated researchers to develop systems capable of automating candidate evaluation, interview preparation, and hiring decision support. Recent studies have focused on integrating natural language processing, speech analytics, computer vision, and large language models to create more realistic and scalable interview assessment environments.

One notable contribution is the Interview platform, which utilizes Google Gemini for role-specific interview question generation and AI-driven feedback mechanisms. The system combines voice interaction with contextual question generation to provide personalized interview preparation experiences. While the platform successfully demonstrates conversational interview simulation, its primary focus remains interview practice and feedback generation, with limited emphasis on comprehensive placement readiness evaluation and multi-dimensional candidate scoring.

Jagtap et al. proposed an AI-driven real-time interview simulation framework that integrates voice recognition, facial analysis, and conversational AI to evaluate both verbal and non-verbal communication skills. Their work highlights the importance of behavioral indicators such as eye contact, facial expressions, and vocal characteristics in interview performance assessment. Research on AI-based mock interview systems has further demonstrated the effectiveness of combining machine learning, facial recognition, sentiment analysis, and speech processing for candidate evaluation. Chavan et al. explored the use of emotion recognition, confidence estimation, and multimodal assessment techniques to generate objective interview feedback. Their findings indicate that AI-assisted evaluation can reduce subjectivity in traditional interview processes and improve assessment consistency. Their study employed deep learning techniques and large-scale interview datasets to

evaluate candidate suitability using visual, vocal, verbal, and behavioral indicators. The proposed framework achieved high reliability and demonstrated the potential of AI-assisted recruitment systems in improving fairness and efficiency during hiring processes. From the literature, it is evident that existing solutions generally focus on individual aspects of candidate preparation, such as resume screening, mock interviews, facial analysis, speech assessment, or hiring automation. Few systems provide a comprehensive framework that simultaneously evaluates resume quality, adaptive interview performance, behavioral indicators, and overall placement readiness. Furthermore, most platforms rely on isolated assessment modules, resulting in fragmented candidate evaluation and limited recruiter insights.

To address these limitations, the proposed ZTalk-AI framework integrates AI-powered resume intelligence, adaptive interview assessment, multimodal behavioral analytics, readiness scoring, and recruiter-oriented evaluation within a single ecosystem. By combining these capabilities, the framework aims to provide a more holistic and data-driven representation of candidate employability readiness compared to existing approaches.

III. PROPOSED MODEL

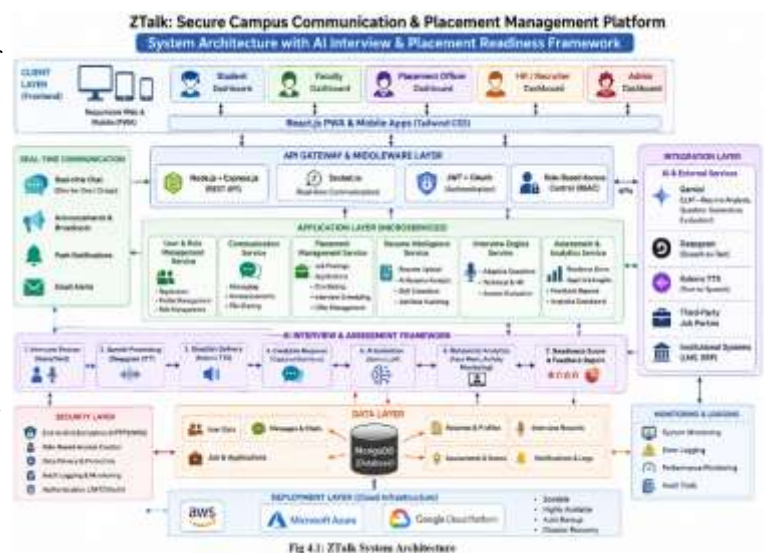


Figure 1. Proposed Model.

Methodology

The development of ZTalk-AI was carried out using an iterative development process in which individual assessment modules were implemented, tested, and refined independently before being integrated into a unified platform. The primary objective was to create a system capable of evaluating different aspects of placement readiness, including resume quality, interview performance, candidate engagement, and assessment integrity.

A MERN-based architecture was selected for implementation due to its flexibility and ease of integration with external AI services. MongoDB was used to store candidate profiles, interview records, assessment reports, and evaluation results. Node.js and Express.js handled backend processing and communication with third-party AI services, while React.js was used to develop an interactive user interface that could support real-time interview workflows and assessment feedback.

The assessment workflow begins when a candidate uploads a resume to the platform. During testing, it was observed that resumes often vary significantly in structure and formatting. To handle this variation, resume content is processed using the Gemini Large Language Model, which extracts information related to education, technical skills,

projects, certifications, and experience. Based on the extracted information, the system generates a concise profile summary and suggests job roles that closely align with the candidate's background. After resume analysis, candidates proceed to the interview stage. Instead of relying on a fixed repository of questions, the interview module generates technical, behavioral, and situational questions dynamically using Gemini. One of the design goals was to avoid repetitive interview experiences commonly found in traditional mock interview systems. As a result, question difficulty is adjusted according to candidate performance, allowing stronger candidates to receive more advanced questions while providing a gradual progression for others.

Both text-based and voice-based interview modes were implemented to accommodate different user preferences. For voice interactions, candidate responses are transcribed using Deepgram Speech-to-Text services, while Kokoro Text-to-Speech is used to deliver interview questions in a conversational format. This approach was adopted to create a more natural interview environment and reduce the dependence on purely text-driven interactions.

Candidate responses are evaluated using multiple criteria, including relevance, clarity, technical accuracy, communication quality, and contextual understanding. During development, special attention was given to maintaining consistent evaluation across interview sessions. Response transcripts, generated scores, and assessment history are stored for subsequent analysis and reporting.

To strengthen assessment reliability, behavioral monitoring features were integrated into the interview workflow. Face-mesh analysis, browser activity monitoring, and session-tracking mechanisms are used to observe candidate attentiveness and identify potential assessment irregularities. Rather than replacing response evaluation, these indicators provide supplementary information that contributes to a broader understanding of candidate performance.

The completed system was evaluated through a series of candidate assessment sessions. Performance measurements focused on response latency, usability, interview realism, role-recommendation accuracy, and proctoring effectiveness. Feedback collected during testing was used to refine question generation, scoring logic, and user interaction workflows, resulting in a more stable and practical placement readiness assessment platform.

Results and Discussion

The evaluation of ZTalk-AI indicated that integrating resume analysis, adaptive interviewing, and behavioral assessment within a single platform provides a more comprehensive view of candidate readiness than conventional preparation methods. During testing, the resume intelligence module was able to generate structured candidate summaries and suggest suitable job roles based on the skills and project information extracted from uploaded resumes. This reduced the effort required for manual resume screening and helped create a consistent candidate profile before the interview stage.

The adaptive interview component contributed significantly to the overall assessment process. Unlike static mock interview systems, the implemented approach adjusted question difficulty according to candidate responses, resulting in interview sessions that felt more personalized and realistic. Feedback collected from participants suggested that dynamic questioning helped maintain engagement and better reflected the progression commonly experienced during actual recruitment interviews.



Figure 2 Secure Candidate Login and Identity Verification Interface.

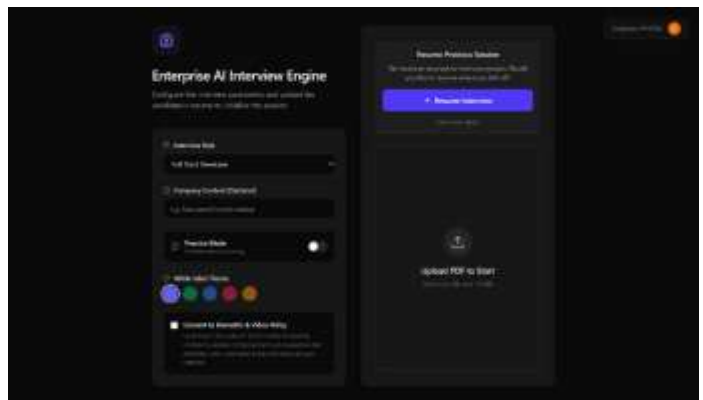


Figure 3 Interview Setup Dashboard



Figure 4 Core Interview Console

Voice-based interactions using Deepgram and Kokoro were successfully integrated into the assessment workflow. The observed response times were sufficient to maintain smooth interview conversations without noticeable interruptions. Behavioral monitoring features, including engagement tracking and assessment integrity checks, provided additional context during candidate evaluation and helped identify irregular assessment behavior during testing sessions.

System performance measurements showed an average resume analysis time of 1.65 seconds and an average interview evaluation latency of 1.15 seconds. When compared with recruiter assessments, the role recommendation mechanism achieved a correlation accuracy of 94.2%. User feedback gathered during pilot testing produced an average satisfaction score of 4.6 out of 5, with participants highlighting interview realism and ease of interaction as key strengths of the platform. Furthermore, the proctoring module achieved a precision of 89.5%, recall of 92.1%, and an F1-score of 90.8%, indicating reliable detection

of assessment integrity events.

Overall, the results suggest that the combination of resume intelligence, adaptive questioning, conversational AI, and behavioral analytics can provide a practical and scalable approach for evaluating placement readiness. While the current implementation produced encouraging outcomes, future evaluations involving larger candidate groups and a wider range of job roles could further validate the effectiveness of the framework.

Observation and conclusion

The development and evaluation of ZTalk-AI provided valuable insights into the use of artificial intelligence for placement readiness assessment. During testing, it was observed that combining resume analysis, adaptive interviews, behavioral monitoring, and readiness scoring within a single platform offered a broader understanding of candidate performance than isolated assessment methods. The integration of the Gemini Large Language Model enabled automated resume interpretation, role-based question generation, and response evaluation, reducing the dependence on manual assessment processes. The inclusion of Deepgram speech recognition and Kokoro text-to-speech technologies contributed to a more natural interview experience, particularly in voice-based assessment sessions. Feedback collected from participants indicated that adaptive questioning and conversational interactions made interview practice feel closer to actual recruitment scenarios. Behavioral monitoring features also provided useful supplementary information regarding candidate attentiveness and assessment integrity without disrupting the interview flow.

From an implementation perspective, the modular architecture proved beneficial for integrating multiple assessment components while maintaining system flexibility and ease of maintenance. Performance results demonstrated that the framework could deliver timely feedback and maintain acceptable response latency even when multiple evaluation processes were executed within the same workflow.

Based on the observations obtained during development and testing, the proposed framework shows potential as a practical tool for placement preparation and candidate evaluation. The results suggest that AI-assisted assessment can help candidates identify improvement areas more effectively while providing structured insights that may support recruitment decisions. Future enhancements may include automated skill-gap analysis, semantic job-role matching, predictive placement analytics, and domain-specific model refinement to further improve assessment quality and personalization.

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